

Question 1**PART A [3 + 3 + 3 = 9 marks]**

1. Define the following terms:

Meta-Data

Database system

2. Briefly explain two situations when using a DBMS may not be suitable, and show an example.

3. Briefly explain three responsibilities of the Database Administrator.

Question 1**PART B [3 + 4 = 7 marks]**

1. Define the following terms:

Database state

DDL

2. Briefly discuss the difference between the logical data independence and physical data independence? Support your answer with examples.

Draw an ER diagram according to the following scenario. Note any unspecified requirements, and make appropriate assumptions to make the specification complete.

We have been asked to develop a database system for a tourism office. The system needs to keep information about customers, cities around the world and the main attractions in these cities. Each city is identified by a unique code, has a name, and belongs to a country. For each city, the system needs to keep information about the number of attractions in the city. For each attraction, the system must store the attraction name (which is unique for a given city), contact (Email, address) and entry price. Each attraction offers a number of facilities. For each facility, we need to store the facility name and price, for example: an attraction may offer a free lunch and another attraction may offer bicycles for 30 Euro. The main aim of the system is to record the reservations made by customers for specific attractions. For each reservation, we need to store the customer's details, the attraction details, and the visit date. The customer details stored in the system are: CPR, name, address, and Telephone(s). In addition, each customer is assigned a unique ID by the system.

Question 3 [3 + 3 + 6 = 12 marks]**Part (A) [3 marks]**

Consider the following relation for exams scheduling in a university for only one semester. A course may have multiple exams and many exams could be done at the same day and time. Each course has only one coordinator, and each coordinator coordinates only one course.

Exam (departmentID, examDate, examTime, courseNo, courseName, courseCoordinator)

Specify the candidate key(s) for the Exam relation, and state any assumptions you make.

Part (B) [3 marks]

Project (PID: int, PName: string (unique), FID:int)

Faculty (FID:int, Fname:string)

Student (SID: int, name: string, PID:int)

The database above shows a senior project database within a department in a university. It is assumed that the department has many students and faculty members, where a faculty member can have many senior projects and students are allowed to work in groups in one senior project.

Specify the foreign keys ~~and candidate keys~~ (if any) for each of the relations above.

Relation	Foreign Key(s)
Project	
Faculty	
Student	

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Question 3**Part (C) [6 marks]**

Populate the relations (project, Faculty, Student) in Part (B) with a few example tuples (i.e. two/three tuples per relation), and then give an example of:

- An insertion that violates the domain and the referential integrity constraints.
- An update that does NOT violate any of the integrity constraints

Question 4 [3 + 2 + 3 = 8]

Consider the database in Question (3)-Part(B) to answer the following SQL questions.

1. Delete all mobile projects that are supervised by a faculty member ID 101, i.e mobile is a keyword within the project name. The projects should be deleted from the *project* relation.
2. List the SID, and name of all students working in one of the following projects ID: 112, 113,114.
3. Create the project relation.